

Habits of Mind #1

The following problem was asked on the NPR program *Car Talk*.

The Chicken Nugget Conundrum

There's a famous fast-food restaurant you can go to, where you can order chicken nuggets. They come in boxes of various sizes. You can only buy them in a box of 6, a box of 9, or a box of 20. So, if you're really hungry you can buy 20, if you're moderately hungry you can buy 9, and if there's more than one of you, maybe you can buy 20 and you divide them up.

Using these order sizes, you can order, for example, 32 pieces of chicken if you wanted. You'd order a box of 20 and two boxes of 6. Here's the question: What is the largest number of chicken nuggets that you *cannot* order? For example, if you wanted, say 31 of them, could you get 31? No. Is there a larger number of chicken nuggets that you cannot get? And if there is, what number is it? How do you know your answer is correct?

Grading Criteria: A complete answer to this problem will satisfy the following conditions.

- (1) Choose a whole number " N " (it may be 31, but it may be larger) that is your answer to the chicken nugget conundrum.
- (2) Explain why it is not possible to have a combination of "boxes of 6" and "boxes of 9" and "boxes of 20" chicken nuggets that add exactly to N pieces of chicken.
- (3) Explain why it is possible to have a combination that equals any number larger than N .

Due Date: At the beginning of class on Wednesday, September 1.